APPLICATION NO. 09/826,117

TITLE OF INVENTION: Hybrid Walsh encoder and decoder for CDMA

INVENTOR: Urbain Alfred von der Embse

ABSTRACT OF THE DISCLOSURE

The invention provides a method and system for the generation of Hybrid Walsh orthogonal codes for CDMA spreading and channelization encoding and fast decoding. Current art uses real Walsh orthogonal codes for CDMA spreading and orthogonal channelization. Hybrid Walsh codes are complex Walsh codes that have a isomorphic one-to-one correspondence with the discrete Fourier transform (DFT) codes and are derived by separate permutations of real Walsh codes for the real and for the imaginary components. Hybrid Walsh codes are the best approximation to the DFT within the constraints of a unity norm, 4-phases on real and imaginary axes, orthogonality, and therefore are a preferred choice for a complex Walsh code. The invention discloses a method for the Hybrid Walsh encoder to be generalized by combining with DFT, quasi-orthogonal PN codes, and other codes using a tensor product construction, direct sum constructioin, and functional combining.